

# PRELIMINARY REPORT ON PHLEBO-SCLEROSIS.\*

By JULES B. FRANKENHEIMER, M. D., San Francisco.

**W**ITHIN the last few years the importance of arterio-sclerosis, both of itself and in relation to other diseases, has been forced on the medical mind. The great impetus to this study has been the discovery of its relation to many conditions which give rise to clinical phenomena of the first importance. Sclerosis in the venous system, on the other hand, has not received much attention, probably because of its lack of practical interest. The present paper was suggested by the finding of a number of cases of phlebo-sclerosis in a certain class of diseases. Data were collected from cases as they were admitted to Dr. Hirschfelder's wards at the City and County Hospital.

The number of cases is too small to draw any absolute conclusions, but the results seemed to be striking enough to warrant some tentative deductions, which we hope to be able to substantiate by a much larger series of cases in the future. The one probable pathological factor which stands out prominently among the many possible causes is cough. Another factor to which we ascribe considerable importance is hard work. Though it is difficult to decide the relative amounts of work done by men in different occupations, nevertheless, it was found that, roughly speaking, the majority of hard workers were affected in varying degree. As to the location of the sclerosed veins, those that suffered most were in the most exposed positions, e. g., over bones, such as the internal malleolus—or where support from the surrounding tissue was the least.

Physiological factors, such as respiratory movements, kind and amount of food, clothes—first for their influence on the temperature of the body; second, in the way of obstruction to the circulation—such as armlets and garters, were not considered.

Most of the work done on this subject has been pathological, the deeper veins of the limbs and trunk receiving most attention. As to its occurrence, more generally than is noted clinically, most authors are agreed. Cases which show it most clearly are cachectic individuals in whom the peripheral veins are fairly well filled. When there is a considerable layer of subcutaneous fat, the condition, unless particularly investigated, is liable to be overlooked, especially, as has been found in this series, when only the slighter or moderate grades are present.

The question arises: Is every palpable vein a sclerotic vein? Much has been written on this question, and Mehnert justly says: "Only the microscopical examination of veins is the true test as to sclerosis." That there is a condition of pseudo-sclerosis both Schlesinger and Parkes Weber have shown. Schlesinger considers some cases of apparent phlebo-sclerosis in the extremities as due to a temporary contraction of the vein. Weber suggests that the compulsory rest in the hospital, with diminished circulation of blood through the limbs, causes some of the superficial veins to be comparatively empty and contracted. Have we, then, any clinical test to differentiate between apparent and true sclerosis? Bennett suggests placing the limb in hot water when the temporary contraction will disappear. He explains the condition of pseudo-sclerosis by increased vein function, and considers it a forerunner of the true sclerosis. If we agree with Bennett that the pseudo merges into the true sclerosis, we can, from a clinical standpoint, allow ourselves a margin of error in the selection of cases.

The object of this investigation was to determine the frequency and etiological factors of thickened veins and their possible diagnostic or prognostic significance. The work done was purely clinical,

there being little opportunity for pathological research. The classification used was slight, moderate and marked. The slight grades were those in which the vein could be picked up in a fold of skin, palpated and rolled between the forefinger and thumb; the moderate an intensified condition of the slight; while those which felt like parchment or were calcareous were called marked. One hundred and eleven cases were investigated, in which 43 were negative, 45 had slight phlebo-sclerosis, 17 moderate and 6 marked. Of the total number of cases, 61.8% showed phlebo-sclerosis in some degree. Of the men 52% showed the condition, of the women 18%, a proportion of 3:1 in favor of the former. Whether this is due to less hard work among women, other things being equal, or to the better support given the veins by the greater amount of subcutaneous fat, could not be determined. Taking only the moderate and marked grades, we find phlebo-sclerosis present in 21% of all cases, the men showing 23%, the women 9%—about the same ratio as when all grades were considered.

Age.—Taking only the moderate and marked forms, the average age of those with the moderate form is 44 years, the youngest being 21 years. The average age of those with the marked form is 53 years; leaving out 2 cases (80 and 70 years), brings the average to 42 years.

It would seem that age, as in arterio-sclerosis, is a factor, but not of the same importance as in arterio-sclerosis.

Venous pressure.—Gaertner's method was used in trying to determine the venous pressure. The method proved unsatisfactory, so it was given up.

Relation to arterio-sclerosis.—There seems to be no marked parallelism between phlebo-sclerosis and arterio-sclerosis. In the 45 cases of slight vein thickening there was no arterio-sclerosis in 21 cases. Slight arterio-sclerosis in 17, moderate in 7 and marked in 1. Of the 17 cases of moderate phlebo-sclerosis, in 5 there was no arterio-sclerosis, in 8 slight arterio-sclerosis, in 3 moderate arterio-sclerosis and in 1 marked. The six marked cases of phlebo-sclerosis showed 1 without arterio-sclerosis, 2 with slight arterio-sclerosis and three with marked arterio-sclerosis. Thus of the 17 cases of moderate phlebo-sclerosis 76% had slight or no arterio-sclerosis, and of the 6 marked cases of phlebo-sclerosis 50% had slight or no arterio-sclerosis.

TABLE.

	AS neg	AS <sub>1</sub>	AS <sub>2</sub>	AS <sub>3</sub>
PS <sub>1</sub>	21	16	7	1
PS <sub>2</sub>	5	8	1	1
PS <sub>3</sub>	1	2	0	3

The influence of alcohol and tobacco.—Data were collected only on the excessive use of alcohol and tobacco. As the table shows, these articles seem to have some influence on the production of phlebo-sclerosis.

TABLE II.

	PS <sub>1</sub>	PS <sub>2</sub>	PS <sub>3</sub>
Alcohol.....	24%	18%	50%
Tobacco.....	51%	30%	66%

Influence of lead.—Only cases in which lead poisoning had occurred or was present were tabulated. Of 10 cases, 4 were negative, 3 had slight phlebo-sclerosis, 2 moderate phlebo-sclerosis, and 1 marked. In two patients who were suffering from lead poisoning the condition was tabulated as slight. Lead does not appear to have any marked influence.

Syphilis.—Only cases (22) with a clear history or showing lesions were considered. Syphilis seems to play no direct part.

Relation to Varicose Veins.—These were found in 11 cases, or 10% of those examined. Five had no phlebo-sclerosis, 5 had slight phlebo-sclerosis, and 1 a moderate degree. It would appear that varicose veins are not common when phlebo-sclerosis is present, and that the moderate and marked forms of phlebo-sclerosis show them less frequently than the

\*Read before the San Francisco County Medical Society.

negative or slight cases. This agrees with Fischer's statement, that in phlebo-sclerosis the regeneration of the elastic tissue almost always appears so soon that dilatation of the vein does not occur.

Relation to infectious diseases.—There seems to be no relation between phlebo-sclerosis and infectious diseases, past or present; pulmonary diseases, tuberculosis especially, excepted.

Relation to the disease for which the patient came to the hospital.—During the investigation it was found that phlebo-sclerosis occurred more often in those patients having cough or a thoracic disease than in other conditions. Of 48 cases of this character examined, only 3 were negative, i. e., showed no phlebo-sclerosis. The diagnosis in these 45 cases was pulmonary tuberculosis 30, pleurisy 1, empyema 2, chronic bronchitis and emphysema 5, cardiac disease 6, adherent pericardium and aneurysm 3, carcinoma of larynx 1.

Chest diseases and cough then occurred in 66% of all positive cases, and if we add 7 more cases who gave a history of chronic cough, but who were tabulated under other diagnoses, we have 76%. Of the cases of intra-thoracic disease 58% showed slight phlebo-sclerosis, 31% moderate and 11% marked. Putting it in another way, 58% of all mild cases, 82% of all moderate cases and 83% of all marked cases, gave a history of cough or thoracic disease. These figures seem to show a great preponderance of the moderate and marked forms of phlebo-sclerosis in chest cases.

In support of this observation it may be said that in 1857 Virchow observed that in valvular lesions of the left heart or chronic affections of the lungs which cause venous stasis, not only the arteries of the lung, but also the entrances of the vena cavae and the liver veins show hyaline thickening. (In both classes of cases cough would be present.) Janvier also remarks in his thesis of 1903 that most of the cases suffered from well-advanced tuberculosis or intra-thoracic disease.

The cause of this apparent association was sought for. Many authors agree with Fischer and Thoma that phlebo-sclerosis, like arterio-sclerosis, is a general disease, with probably the same causes, though it may be local, that angio-sclerosis is an inflammation with unexplained etiology, that in the circulating blood toxins or products of disturbances of metabolism, etc., cause a disappearance, a degeneration of the elastic tissue and so a compensatory thickening—an angio-sclerosis.

In trying to explain this association of chest cases and phlebo-sclerosis, we first considered the possible action of a toxine circulating in the blood. Tubercular toxin seemed to fit the majority of cases.

Two cases were found who had tubercular sinuses lasting for several years—one of the elbow, the other of the shoulder. Both cases showed clinical signs of slight pulmonary involvement, but without much cough. In one of them there was no phlebo-sclerosis, in the other a very slight grade.

Again, two patients with very acute pulmonary tuberculosis were examined; one case had lasted six weeks, the other two months. In one there was no phlebo-sclerosis, in the other it was very slight. The absence of phlebo-sclerosis in these two classes of cases, those with the tubercular sinuses and those with rapid development of pulmonary tuberculosis, seemed to negative the tubercular toxine theory. The recital of the above cases is merely a suggestion.

That phlebo-sclerosis is capable of rapid development was shown by a case of chronic pericarditis, pleurisy and tuberculosis, who on admission was tabulated as slight phlebo-sclerosis; three months later one of the subcutaneous veins of his arm was like a pipe stem.

On seeking another explanation, cough was considered as a factor. The sudden increase of intra-

thoracic pressure which occurs on coughing causes a reflux of blood into the veins. The sharp impact of the column of blood injures the elastic coat of the vein; this injury being the starting point for the inflammatory or regenerative thickening. In one of his conclusions Sachs remarks that "diffuse phlebo-sclerosis and arterio-sclerosis are found mostly in those regions where the lateral pressure of the blood suffers quick or large variations which hinder the regulation of the vessel tonus." We have found, further, that in chest cases the phlebo-sclerosis occurs mostly or is most marked in the upper extremities. This might be explained by the fact that the column of blood, having a shorter distance and a more direct route to travel, the shock, and hence the injury to the veins, will be greater than in the lower extremities.

There is some difference of opinion among authors as to where phlebo-sclerosis shows itself most frequently. Bregman states "that the slighter grades of phlebo-sclerosis are proportionately more frequent than the moderate and marked grades, especially in the upper and lower extremities, the most marked, however, in the upper." The explanation offered is that in the propulsion of blood the supporting muscular contractions are fewer. On the other hand Sachs concludes that the veins of the lower extremity are oftener and more severely affected than those of the upper extremity.

In men doing heavy work, other things being equal, phlebo-sclerosis is found mostly in the lower limbs. The explanation assumed is that in heavy lifting or hard work of any kind a column of blood varying in height from two to four feet is the additional factor which determines the lower limbs to be affected more than the upper.

It is rather striking that in the chronic venous congestion of cardiac disease, the moderate and marked forms of phlebo-sclerosis are not common. This fact also lends some negative support to the view advanced above, that cough is one of the main factors in the production of phlebo-sclerosis and that venous congestion does not play such an important role.

#### Conclusions:

1. Phlebo-sclerosis is more common than is generally supposed.
2. While there is no direct relationship, age predisposes to it.
3. There is no direct parallelism between phlebo-sclerosis and arterio-sclerosis.
4. The excessive use of alcohol and tobacco seems to be an etiological factor, directly or indirectly.
5. Lead poisoning and syphilis, contrary to expectation, have probably slight or no influence on the production of phlebo-sclerosis.
6. The comparative infrequency of varicose veins in cases of phlebo-sclerosis seems to show that phlebo-sclerosis is a conservative rather than a degenerative process.
7. Previous infectious diseases (except tuberculosis) seem to play no part in the production of phlebo-sclerosis.
8. Apparently phlebo-sclerosis has no diagnostic or prognostic significance.
9. While there may be many causes of phlebo-sclerosis which we have not determined, the most important factor (judging from this short series of cases) is cough. The purely mechanical trauma being the starting point for the sclerosis.

---

Patients with long and thick foreskins, when suffering from gonorrhea, are rather unfavorable subjects for a speedy cure. The prepuce seems to keep the urethra in an abnormally hyperemic condition, thus favoring microbial growth.—*International Journal of Surgery.*